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THE
AMERICAN NATURALIST.

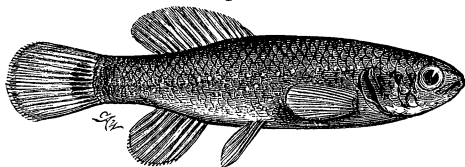
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MUD-LOVING FISHES.

BY CHARLES C. ABBOTT, M.D.

Fig. 86.



Melanura limi.

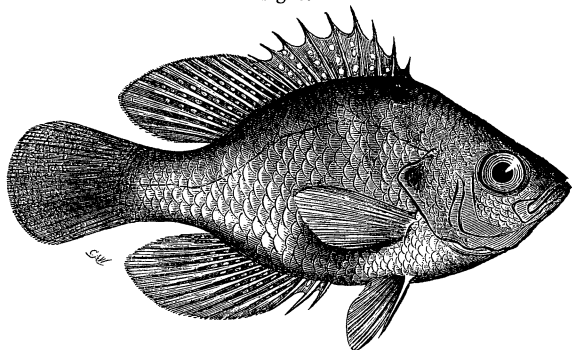
MUCH is lost to those who essay to study the habits of fresh-water fishes, first, by ignoring uninviting mud-holes, and secondly, by walking carelessly to the banks of the stream, and seeing nothing at first, think they are themselves unseen by anything inhabiting the water. Never was there a greater mistake! Nine times in ten, if these same streams be approached cautiously, and yourself concealed, you peer carefully into the water, you will find it tenanted by many and larger fishes, than you supposed were there. Following out this plan, we once saw and captured a chub (*Semotilus rhotheus*) thirteen inches long, in a narrow brook of but six inches in depth. This fish, when the bank was carelessly approached, would withdraw to a deserted muskrat burrow.

After standing quietly for a few minutes upon the bank of a stream that has been openly approached, one will notice

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the gradual appearance of the fishes your sudden presence startled and sent off; but returning under such circumstances they are not the same fish in their movements; for although *they may appear to swim about fearlessly*, they nevertheless are watching you, and fail to exhibit many of their peculiar habits. An aquarium, even, in which fishes become tame, is best watched at a distance, as more is going on generally, than when you are near by. Fish are like children, fuller of mischief when alone. These remarks, be it understood, apply to some species—not all. What we design considering as mud-loving species are nine in number, all common to the Delaware and its tributaries, at and near Trenton,

Fig. 87.



Enneacanthus guttatus.

New Jersey. They are the Spotted Sun-fish (*Enneacanthus guttatus*,* the Mud Sun-fish (*Acantharcus pomotis*), the Mud Minnow (*Melanura limi*), Mud Pike (*Esox porosus*), Mullet (*Moxostoma oblongum*), Black Sucker, *Catostomus* (*Hylomyzon*) *nigricans*, Mud Cat-fish (*Amiurus DeKayi*), Eel (*Anguilla tenuirostris*), and the Lamprey (*Petromyzon nigricans*). (We consider the *Ichthyomyzon appendix* as the young of the last, or an allied *Petromyzon*).

Spotted Sun-fish (*Enneacanthus guttatus*). We have very

* We trust the nomenclature of our fishes is finally established; and no species will be farther burdened with confusing synonymy. We follow Cope (Journal Acad. Nat. Sci., Phil., Vol. vi, part 3, p. 216, Jan., 1869), in this paper; and if farther changes are proposed, feel now as though we should adopt them with reluctance.

carefully searched for a trait characteristic of this fish as compared with *E. obesus*, and have uniformly failed to do so. The habits of the species are those of the Centrarchidæ generally, modified in so far as being merely more of a mud-loving species. So purely a mud-dwelling fish are they that we have frequently found them in water so shallow, that they marked the mud with their pectoral fins in swimming; preferring such shallow water, with the mud, to that which was deeper, to which they had access, because it was over a stony bed. In winter they congregate in deep water, and unless care is taken to dig well into the mud they will not be taken in the ordinary scoop-net. We found, during the past winter, in one instance, that a large number had *apparently* scooped out a basin in the bottom of a little pond. At any rate, closely huddled together, in a small space, somewhat deeper than the surrounding bed of the pond, was a large number. Examination of several showed they were then taking no food. The stomach of each specimen, and the whole digestive tract, in fact, were empty.

The main interest attaching to this species, at least to us, is the fact of its occupying many small, sluggish streams, similar and side by side with others that harbor, though less abundantly, the *E. obesus*. We never yet have found them associated in small streams, in the tributaries of the river; yet, in the Delaware itself the *E. obesus* is occasionally, and the *guttatus* frequently found. North-east of Trenton, in the Spar-kill, a creek emptying into the Hudson, and in the streams along the coast, emptying into the bays, the *E. obesus* abounds; and the *guttatus* has not been found. Along the Delaware both are found, the *guttatus* more abundantly. Professor Cope has found *E. guttatus* near Richmond, Virginia, and (verbal communication) has not found it about Philadelphia. It is undoubtedly in the Delaware, at Trenton—distance thirty-seven miles. We have been thus particular in stating its habitat, because the fact of its not associating with the *E. obesus* is a mystery we cannot explain,

except in the manner following. The similarity of these two *Enneacanthi* is so marked, that unless living, they can scarcely be distinguished; and considering the abundance of one and presence of the other, but not associated, we suggest that the *E. obesus* is with us, not of its own choice, but forcibly brought by freshets from the localities where it is the only *Enneacanth* (New York State) to this, the proper territory of the *E. guttatus*. Once here it occupies certain streams from which it has driven the former occupant, *E. guttatus*. It is always found in the streams having unobstructed access to the river. If this be a true explanation of its presence does it not confirm its claim to a distinct specific title? In the "Geology of New Jersey" we confounded the two species, considering *Pomotis guttatus* Morris, a synonym of *Bryttus obesus* Girard.

On the 16th of March we found females of the Mud Minnow (*Melanura limi*), in clear, cold, running water. They were much distended with large masses of orange-colored eggs, that we should judge were nearly "ripe." We have watched them frequently since but failed to find them depositing these ova. At this time, April 19, a large proportion of the females are no longer gravid. It would appear that in March they were passing up stream, or brook, to spawn, but appeared to be unaccompanied by males.

We have lately found that this fish, when grown, feeds largely upon small shells (*Physa* and *Lymnæa*). We have seen them seize the animal, crush and then drop the shell, and then, by nibbling at the extruded soft parts, finally succeed in devouring all but the shell. Young crawfish are also worried to death by this cyprinodont, which at first bites off the larger claws, and ultimately succeeds in crushing the whole shell. On the other hand they are themselves exposed to attacks from a voracious animal, which takes advantage of their lying buried in the mud. We refer to the odoriferous Cinosternoid (*Ozotheca odorata*). This turtle appears to be able to discover the whereabouts of the mud-

minnows without alarming them; and cautiously approaching from behind, they seize the head of the fish that is scarcely extruded from the mud. This they generally completely sever from the body, cast aside, and then draw from the mud the decapitated body. We doubt the ability of this turtle to catch a mud-minnow not concealed *in* the mud. When lying *on* the mud, like an Etheostomoid, their movements are very rapid when disturbed.

In speaking of the habits of certain species of fishes as 'mud-loving,' or dwellers in and upon mud, we really indicate merely those species that are most truly nocturnal. We judge that, to a certain extent, all fish are nocturnal. We have often noticed that fish will leap from an aquarium, if uncovered during the night; but this occurs but seldom during the day. Fishing with a line has always been more fruitful with us at night than fishing during the day; even when fishing for yellow or white perch, and other active day fish. Nets set over night entrap a greater number, and larger specimens, than when set for the same number of hours between sunrise and sunset.

These remarks are peculiarly applicable to the two Catostomoids we have mentioned above, *Moxostoma oblongum* and *Hylomyzon nigricans*. Unless quite small, less than six inches in length, these "suckers" remain quiet throughout the day; but as night approaches they leave the shallow, muddier portions of the creeks, and swim towards and into the deeper waters. About sunset we have often noticed them coming to the surface, and with their nostrils above the water, they make a low, sibilant sound, and leave in their wake a long line of minute bubbles. When attacked, as they frequently are at this time, by turtles, they give a very audible grunt, similar to that of our chub when drawn from the water. Both of these "suckers" are occasionally found, even during the day, in running water, hunting among the stones upon the bottom; but still water and soft mud are never far distant. The "suckers" of our rivers are very

different in *their* likes and dislikes. Coming up the stream in February and March, the large-scaled species, *Teretulus macrolepidotus*, and the common *Catostomus Bostoniensis*, seek out rapid waters, rocky bottoms, and are so active and fearless during the day, that many are seen and killed in the shallow waters they have entered. This is very noticeably the case at Trenton, New Jersey, where the Assunpink creek enters the Delaware. The "suckers" come up to the foot of the dam and congregate there in large numbers. Both of these species bite readily at a hook; but the "mullet" and "black-sucker" never do with us.

We can imagine nothing more devoid of interest than a mud-catfish (*Amiurus DeKayi*), at least as we have them here in New Jersey. Occasionally one of unusual size is met with to give it some characteristic worthy of attention. The largest specimen we have ever seen weighed five pounds, thirteen ounces. The greatest width of the head was five and one half inches. This species wallows in the mud in the beds of streams of all sizes; it is abundant in many of our largest creeks, in every mill-pond, and in average sized ditches with overhanging banks, this "mud-lover" frequently congregates in large numbers. It is a little curious to notice how soon matters right themselves, as to the distribution of fishes, after a freshet has subsided which had obliterated the previous boundaries. We have in mind now an extensive tract of meadow, through which meanders two rapid current creeks, and also through it are cut innumerable ditches. In these ditches dwell several mud-loving fish. Of course the freshet produces considerable of a "scatter" among them; but on the subsidence of the water we very seldom find mud cat-fish in the clear-water creeks, and the running water species caught napping in the ditches very promptly leave, as a few days suffice to restore to each locality its characteristic species.

In our report in the "Geology of New Jersey," we gave but three fresh-water siluroids. Since then we have had our

attention called to the stone cat-fish (*Noturus gyrinus*), from the Delaware Water Gap, Warren County, New Jersey. Besides the specimens from this locality in the Museum of the Philadelphia Academy we have seen one living specimen in an aquarium, taken in the Assunpink Creek at its mouth. This is the only living specimen taken in New Jersey that we have ever seen, but learn that it is common in some of the rocky creeks in the northern part of the State.

The Eel (*Anguilla tenuirostris*), as elsewhere we suppose, is abundant in all our water courses. A careful examination of specimens from various localities, and comparison of reports of local fishermen, tend to the fact (?) that the largest eels are to be found in the rivers and streams directly tributary to them; and that in isolated mill-ponds far distant from the main water courses, they are not so large or numerous. We do not admit that such is really the case, but it does *appear to be true*. The experience of other observers would be interesting to know; and how large do our various species of *Anguilla* grow, as found in fresh-water? In the Delaware and its many small tributaries we find the Lamprey (*Petromyzon nigricans*) very abundant. Although occasionally found sticking to the sides of large fish, shad, rock-fish, white-perch and chub, they do not appear to feed upon fish thus exclusively. We have frequently found a large quantity of them adhering to the carcasses of dogs and other drowned animals, and judge that they subsist upon dead, rather than living animal matter. In an aquarium they adhere to the glass sides and *remove* the green scum very effectually, but whether they devour it or not we could not ascertain. We have known the Lampreys to *suck* their way up the facing of mill dams and so wander far up from the river. In such cases they bury themselves in the mud, in the winter, as do eels instead of following the river out into the sea.